CAP Q-Probes and Q-Tracks: 15 Years of Laboratory Quality Indicator Development

Richard J. Zarbo, MD, DMD

History of Programs

- **Q-Probes**
  - 1st major inter-institutional QI program in Pathology
  - Since 1989- 122 studies of indicators of lab quality
  - 'Off the shelf' time-limited QI studies
    - 100-900 lab participants each, >3000 unique labs to date, international
  - Standardized data input, statistical design, analysis
  - Address all phases of lab testing, all major disciplines
- **Q-Tracks**
  - Based on successful Q-Probes studies
  - Since late 1998- 12 continuous indicators
  - Longitudinal tracking key indicators, accreditation related
    - 63-227 lab participants each, 918 unique labs
    - Review trends and patterns, moving external reference benchmarks
    - Identification of best practices & best performers
  - Measures of process, outcome, health status, patient perception of quality

Q-Probes → Q-Tracks

Q-Probes	Q-Tracks
"snap-shot"	"movie"
one time	longitudinal
limited, short term	extended, long term
mailed reports	OCR fax, then on-line
single report	quarterly reports
new, varied topics	fixed, quality indicators
numerous variables	fewer variables
comprehensive	focused
analytic text report	graphical report
benchmarks	best practices
no trended data	trended data

Successes

- 85 peer reviewed publications, 50 abstracts
- Defined benchmarks, no previous information
- Frequent citation in peer reviewed literature
- Q-Probes
  - Juran Institute conference invitation 1991
  - Awarded outstanding benchmarking program in medicine by Healthcare Forum Journal 1993
- Q-Tracks
  - 1999 ORYX hospital & AMAP physician self assessment approved
  - 1st multi-lab databases demonstrating statistical performance improvement with continuous monitoring (4 of 6 indicators)

Q-Tracks 1999-2003

- **Clinician/Customer Performance**
  - Pap smear-biopsy correlation
  - Patient wristband ID accuracy
  - Laboratory specimen acceptability
  - Blood culture contamination
  - In-date blood product wastage
- **Lab/Pathologist Performance**
  - Frozen section correlation
  - Small surgical specimen diagnosis turnaround time
  - STAT test turnaround time outliers
  - Morning rounds inpatient test availability
  - Critical values reporting
  - Inpatient phlebotomy success rate
- **Patient Perception of Care**
  - Satisfaction with outpatient phlebotomy

Deliverables

- Definition of drivers of quality
- Standardized data collection tools
- External comparative benchmarks
  - No comparable literature for most
- Peer group comparisons
- Best practices, best performer profiles
  - Median performance as good if not better than best of literature
  - Identify opportunities for improvement

Generic Laboratory Test Cycle Phases

Procedural
Patient and specimen preparation, identification, transportation, handling, accession

Technical & Diagnostic
Test method, lab protocols, criteria, terminology, accuracy, report content, analytic timeliness

Communication
Report delivery, format, clarity, overall timeliness, integration of information, satisfaction

Preanalytic | **Analytic** | **Postanalytic**

AP Test Cycle Indicators

- **Pre-analytic Q-Probes**
  - **Specimen labeling/identification**
  - **Fine needle aspiration adequacy**
  - **Autopsy permit information adequacy**
  - **Specimens exempt from submission and gross only**
  - **Necessity of clinical information for diagnosis**

AP Test Cycle Indicators

- **Analytic Q-Probes**
  - Surgical report content adequacy
  - Frozen section correlation, (Q-Tracks)
  - Surgical report timeliness (Q-Tracks)
  - Gynecologic/nongynecologic cytology report timeliness
  - Autopsy report timeliness
  - Pap smear rescreening, current high grade SIL
  - Cervical biopsy-cytology PAP smear correlation (Q-Tracks)
  - Extraneous tissue on surgical slides
  - Diagnostic uncertainty in prostate needle biopsy
  - AP discrepancies - second pathologist review

AP Test Cycle Indicators

- **Post-analytic Q-Probes**
  - Clinician expectations in path reports
  - Autopsy-premortem clinical diagnosis correlation
  - Autopsy result clinical utilization
  - Follow-up of abnormal gynecologic cytology
  - Outcomes assessment of early breast cancer diagnosis
  - Extradepartmental consultation practices
  - Customer satisfaction- anatomic pathology services
  - Amended reports/errors

Pre-analytic Indicators

- Specimen labeling/identification
- Provision of clinical history

Pathology
Specimen Labeling Policy

Patient Safety

Error Avoidance

Risk/Liability Management

Accreditation Standards Compliance

Regulatory Requirements

- **JCAHO**
  - 2002 focus: "criteria for rejecting unacceptable specimens"
  - "Specimens are properly labeled… and identified as to the patient, specimen and source. In general, proper specimen labeling includes patient's full name, complete specimen identification, and a unique identification number."
- **CAP**
  - "Specimens lacking proper identification …should not be accepted by the laboratory."
- **AABB, FDA**

Surgical Path Practice - 1994

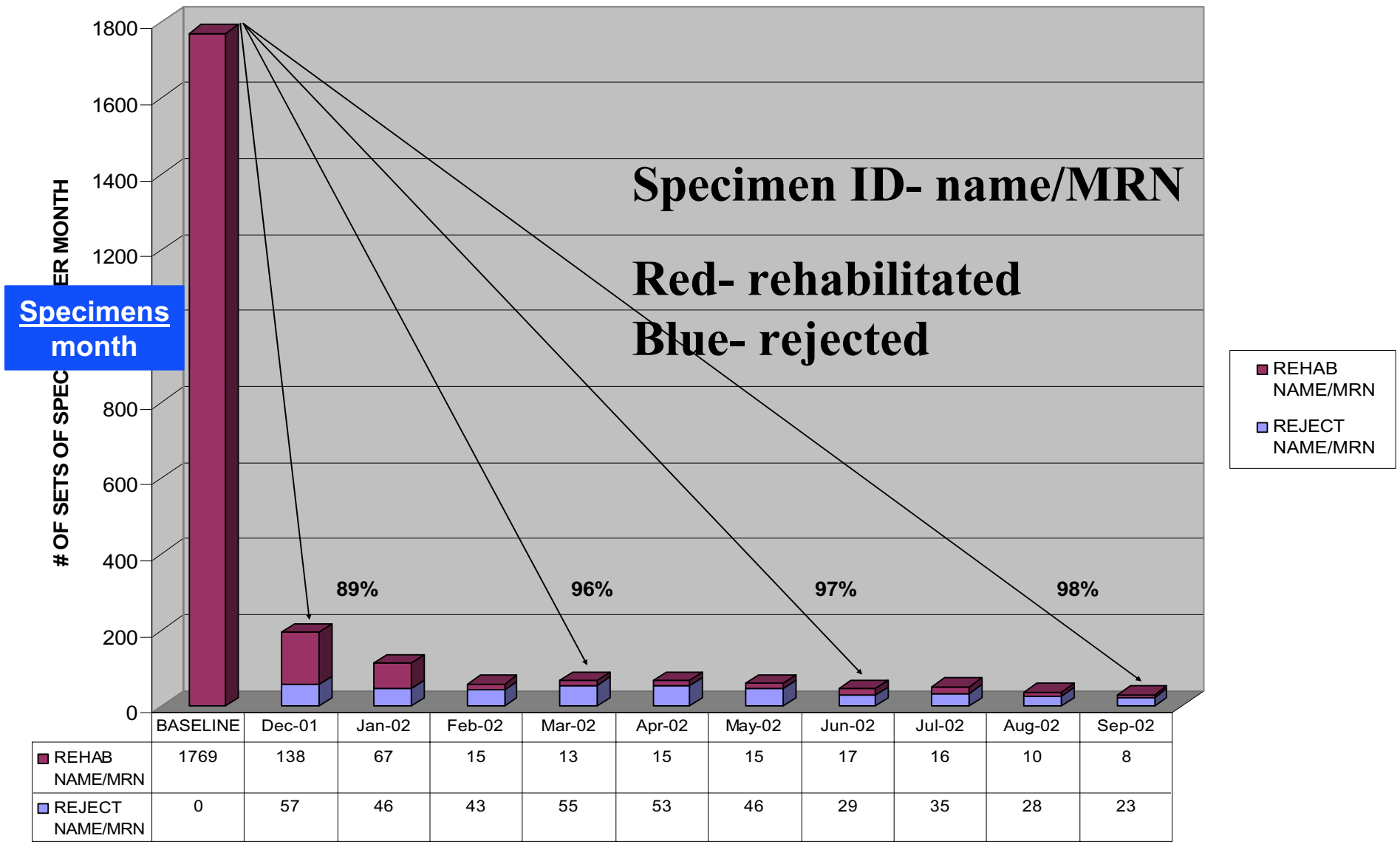
- Specimen labeling- preanalytic QC benchmark
- 417 labs examined 1,004,115 case accessions
- Specimen transport, accession, labeling

Specimen defects	Aggregate%	No. cases
Overall deficiency rate	6%	60,042
Patient identification	9.6%	4,827
(No label on container)	(1.8%)	1,234
Incorrect/missing info	77%	54,357
(No clinical history)	(40%)	27,590
Handling problem	3.6%	2,465
(Lost in transport)	(0.1%)	91

data from Q-Probes 1994

Nakhleh RE, Zarbo RJ: Arch Pathol Lab Med 120:227, 1996

SPECIMEN LABELING ACCEPTABILITY - NAME/MRN



	BASELINE	Dec-01	Jan-02	Feb-02	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02
REHAB NAME/MRN	1769	138	67	15	13	15	15	17	16	10	8
REJECT NAME/MRN	0	57	46	43	55	53	46	29	35	28	23

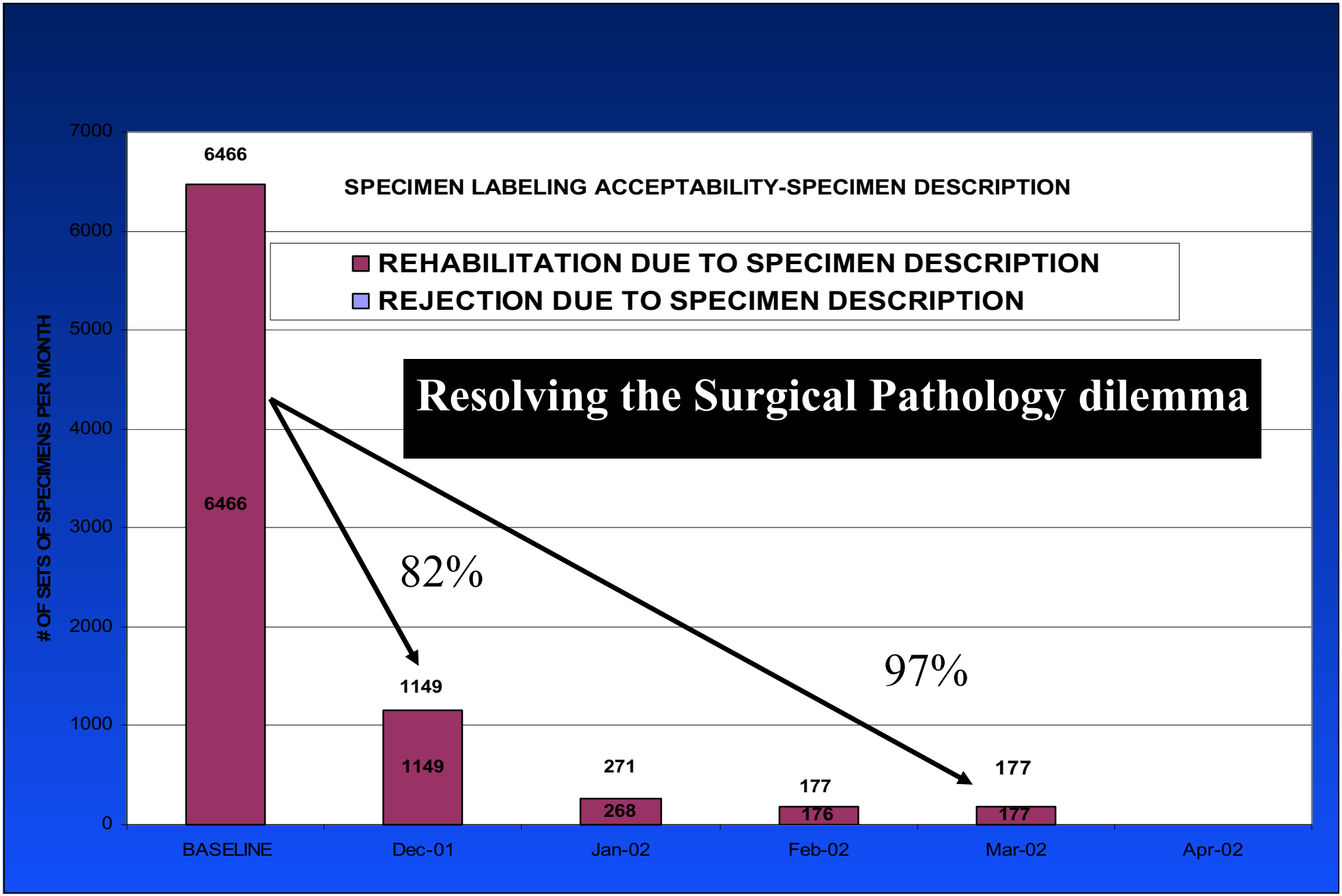
Surgical Path Practice - 1998

- Clinical history- preanalytic QC benchmark
- 341 labs examined 771,475 case accessions
- No diagnosis due to inadeq. clin. info- 0.73% overall

percentile ranking-all labs

	10th	50th	90th
Inadequate clinical info precluding diagnosis	3%	0.62%	0.08%
Delayed report		32%	
> 1 day delay		15%	

data from Q-Probes 1998
Nakhleh RE, Gephardt GN, Zarbo RJ: Arch Pathol Lab Med 123:615, 1999


SPECIMEN LABELING ACCEPTABILITY-SPECIMEN DESCRIPTION
REHABILITATION DUE TO SPECIMEN DESCRIPTION
REJECTION DUE TO SPECIMEN DESCRIPTION
OF SETS OF SPECIMENS PER MONTH
7000
6000
5000
4000
3000
2000
1000
0
6466
6466
1149
1149
271
268
177
176
177
177
82%
97%
Resolving the Surgical Pathology dilemma
BASELINE
Dec-01
Jan-02
Feb-02
Mar-02
Apr-02

If 99.9% is Good Enough…..

- **In the next 24 hours –**
  - 1,892,160 misplaced phone calls
  - 528,000 checks deducted from wrong bank accounts
  - 207,333 books shipped with wrong cover
  - 107 incorrect medical procedures performed
  - 56 incorrect drug prescriptions written
  - 12 babies will be given to wrong parents
- **Lab with 6.5 million tests -**
  - 6,500 incorrect tests per year or 18 per day
- **Should specimen labeling and patient identification be a top priority?**
- **Do you watch the nightly news?**

Analytic Indicators

- **Frozen section correlations**
  - Diagnosis
  - Deferral
  - Physician performance assessment
    - Annual JCAHO credentialing

Surgical Path Practice - 1989

- M.D. interpretation- analytic QA benchmark
- 297 labs correlated 79,647 frozen sections

	percentile ranking-all labs		
	10th	50th	90th
How many frozen section discrepancies with permanent sections	5%	1.7%	0%
How many deferred?	7.5%	2.6%	0%

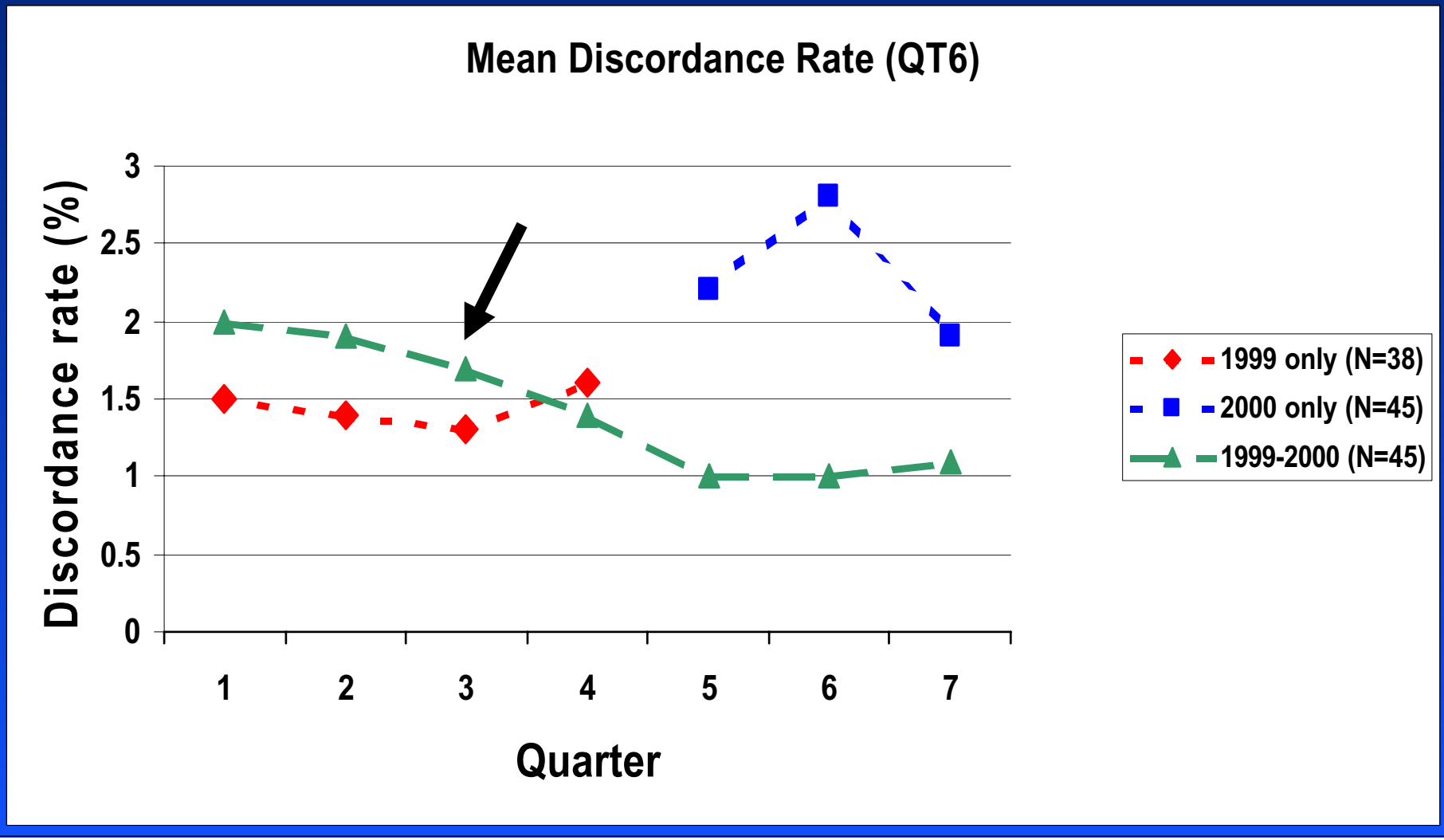
data from Q-Probes 1989
Zarbo RJ, Hoffman GG, Howanitz PJ: Arch Pathol Lab Med 115:1187, 1991

Outcome Measures

Q-Tracks Intraoperative Consultation module

- **Outcome of frozen section exam-**
  - **28-47% cases- Surgery modified, terminated, new procedure initiated** (Zarbo et al: Arch Pathol Lab Med 120:19, 1996)
- **Main indicators**
  - **FS diagnostic discordance with permanent**
  - **Deferred diagnosis rate**
- **Secondary indicators**
  - **FS errors and deferred stratified by:**
    - **Reasons for FS discordance**
    - **Qualified by diagnostic mission & anatomic site**
    - **By primary pathologist and consultant**

Q-Tracks FS Quality Improvement



Best Performers 1999-2000

Associations- better rates FS concordance

- **Professional**
  - 2 full years of Q-Tracks monitoring
  - Active monitoring FS > 3 years
  - Established thresholds for corrective action
  - Established appropriateness criteria for deferrals
  - Specific pathologist or committee for FS review
  - Emphasized good preop and intraop communication with surgeon
  - Mandated intradepartmental consults all malignant FS diagnoses
- **Technical**
  - Routinely cut 2 levels each FS block
  - Histotechnologist cut sections

Post-analytic Indicators

- Autopsy-identification of significant missed premortem diagnoses
- Customer satisfaction surveys
- Amended reports/errors

Autopsy Practice – Q-Probes 1993

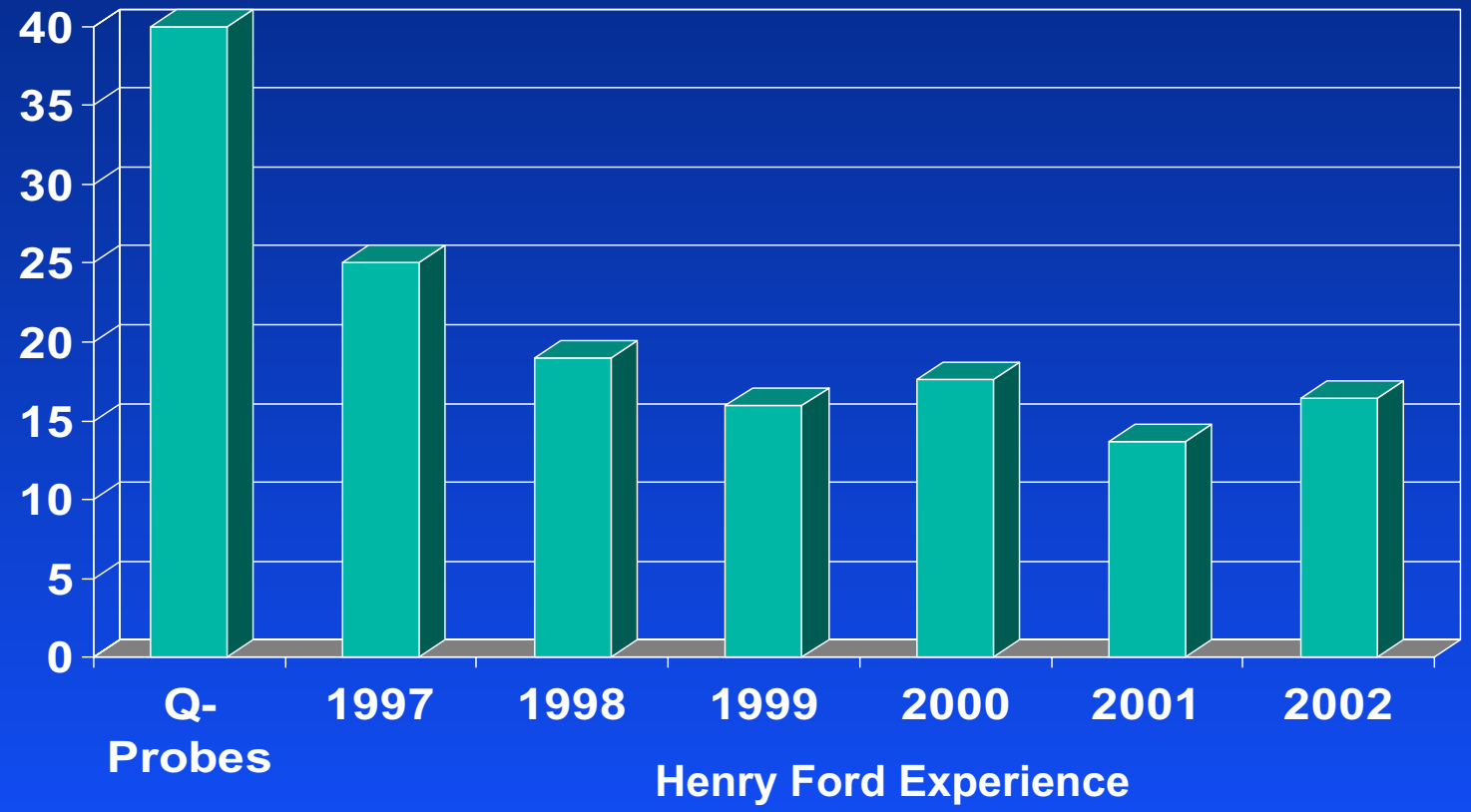
- 248 institutions, 2479 adult autopsies, 6427 clinical questions
- Identification of significant unexpected diseases
  - Major, contributing to death
  - Major, not contributing to death but may have eventually contributed, or required treatment

	Aggregate%
Clinical questions resolved	93%
Major DX, contributing to death	39.7%
Major DX, not contributing	24.0%

data from Q-Probes 1993
Zarbo RJ, Baker PB, Nakhleh RE: Arch Pathol Lab Med 123:191, 1999

Autopsy Clinico-Pathologic Correlation

Adult cases with major unexpected findings contributing to death



Customer satisfaction

Have you measured

"referring physicians' and patients' satisfaction with the laboratory service within the past 2 years?"

CAP Lab General checklist question GEN:22875 (2001)

AP Customer Satisfaction- 2001

- Q-Probes- 95 labs submitted 3,065 physician surveys
- Up to 50 per lab, mean response rate 35%

EXCELLENT TO GOOD RATINGS (aggregate %)

- 93.8% Quality of professional interaction
- 93.4% Diagnostic accuracy
- 92.3% Pathologists responsiveness to problems
- 91.0% Courtesy of secretarial/technical staff
- 90.7% Pathologists accessibility for frozen sections
- 90.3% Tumor Board presentations
- 85.7% Teaching conferences and courses
- 85.2% Communication of relevant information
- 84.2% Notification of significant abnormal results
- 77.0% Timeliness of reporting

Higher Overall Satisfaction

Labs with superior overall satisfaction

- Fixed, largely uncontrollable factors
  - Lower % outpatient AP testing
- Controllable by the Pathologist manager- customer focus
  - Specific TAT goals for resections, placed images in pathology reports

Labs with superior TAT and communication

- Fixed, uncontrollable
  - Non-teaching hospitals, without pathology residency
- Controllable by the Pathologist manager- customer focus
  - Policy for alerting clinicians of medically critical values

Ref: Zarbo RJ, Nakhleh RE, Walsh M: Customer satisfaction in anatomic pathology: A CAP Q-Probes study of 3065 physician surveys from 95 laboratories. Arch Pathol Lab Med 127: 23-29, 2003

Surgical Path Practice – 1996 Reporting Errors

- Specimen labeling- postanalytic QA benchmark
- 359 labs examined 1,667,547 reports
- Overall amended rate 0.19% (median 0.15% = 1.5/1000)
- 1500 errors/million rate

Report Type	percentile ranking-all labs		
	10th	50th	90th
Patient identification	0.13%	0%	0%
Diagnosis	0.19%	0.04%	0%
Other info significant to patient management/prognosis	14%	1.1%	0%

data from Q-Probes 1996
Nakhleh RE, Zarbo RJ: Arch Pathol Lab Med 122:303, 1998

What about amended rates?

- **The harder you look…..and when**
  - ➢ Active slide review after signout = 0.16%
  - ➢ No slide review policy = 0.14%
  - ➢ Active slide review before signout = 0.12%
    - lower rates of changed diagnosis & other info
    - set % cases, all malignant, all cases, problem prone organ
    - NO practice consensus

Errors by Test Cycle Phase in Anatomic Pathology

Preanalytic Error

up to 85%

Postanalytic Error

up to 94%

Analytic Error

up to 15%

Q-Probes

Quality by Design

- **Increase**
  - Accuracy
  - Content v
  - Completeness v
  - Timeliness v
- **Decrease**
  - Variation v
  - Cost

2 Main messages

- **Opportunities for improvement of existing services (pre and post analytic)**
  - **1. Patient safety related policy (pre-)**
  - **2. Communication enhancements (post-)**

Q-Tracks©

QUALITY IS NOT STATIC

MOVING TARGETS
OF IMPROVEMENT

CONTINUOUS QUALITY IMPROVEMENT

Zarbo RJ, Hoffman GG, Howanitz PJ: Interinstitutional Comparison of Frozen-Section Consultation: A College of American Pathologists Q-Probe Study of 79,647 Consultations in 297 North American Institutions. Arch Pathol Lab Med 115:1187-1194, 1991.

Howanwitz PJ, Hoffman GG, Schifman RB, Zarbo RJ, Steindel SJ, and Walker K: A Nationwide Quality Assurance Program Can Describe Standards for the Practice of Pathology and Laboratory Medicine. Qual Assur in Health Care 4: 245-256, 1992.

Zarbo RJ: Interinstitutional Assessment of Colorectal Carcinoma Surgical Pathology Report Adequacy: A College of American Pathologists Q-Probes Study of Practice Patterns from 532 Laboratories and 15,940 Reports. Arch Pathol Lab Med 116:1113-1119, 1992.

Zarbo RJ, Gephardt GN, Howanitz PJ: Intra-laboratory timeliness of surgical pathology reports: results of two College of American Pathologists Q-Probes Studies of biopsies and complex specimens. Arch Pathol Lab Med 120:234-244, 1996.

Nakhleh RE, Zarbo RJ: Surgical pathology specimen identification and accessioning: A College of American Pathologists Q-Probes study of 1,004,115 cases from 417 institutions. Arch Pathol Lab Med 120:227-233, 1996

Gephardt GN, Zarbo RJ: Interinstitutional comparison of frozen section consultations. A College of American Pathologists Q-Probes study of 90,538 cases in 461 institutions. Arch Pathol Lab Med 120:804-809, 1996.

Gephardt GN, Zarbo RJ: Extraneous tissue in surgical pathology. A College of American Pathologists Q-Probes study of 275 laboratories. Arch Pathol Lab Med 120:1009-1014, 1996.

Zarbo RJ: Quality assessment in anatomic pathology in the cost-conscious era. Am J Clin Pathol (Suppl 1, Pathol Patterns) 106:S3-S10, 1996.

Zarbo RJ, Gephardt GN, Howanitz PJ: Intra-laboratory timeliness of surgical pathology reports: results of two College of American Pathologists Q-Probes Studies of biopsies and complex specimens. Arch Pathol Lab Med 120:234-244, 1996.

Novis DA, Gephardt GN, Zarbo RJ: Inter-institutional comparison of frozen-section consultation in small hospitals. A College of American Pathologists Q-Probes study of 18,532 frozen section consultation diagnoses in 233 small hospitals. Arch Pathol Lab Med 120:1087-1093, 1996.

Nakhleh RE, Jones B, Zarbo RJ: Mammographically directed breast biopsies. A College of American Pathologists Q-Probes study of clinical physician expectations and of specimen handling and reporting characteristics in 434 institutions. Arch Pathol Lab Med 121:11-18, 1997.

Novis DA, Zarbo RJ: Inter-institutional comparison of frozen section turnaround time. A College of American Pathologists Q-Probes study of 32,868 frozen sections in 700 hospitals. Arch Pathol Lab Med 121:559-567, 1997.

Nakhleh RE, Zarbo RJ: Amended reports in surgical pathology and implications for diagnostic error detection and avoidance: a College of American Pathologists' Q-Probes study of 1,667,547 accessioned cases in 359 laboratories. Arch Pathol Lab Med, 122:303-309, 1998.

Novis DA, Zarbo RJ, Saladino AJ: Interinstitutional comparison of surgical biopsy diagnosis turnaround time: A College of American Pathologists Q-Probes Study of 5384 surgical biopsies in 157 small hospitals. Arch Pathol Lab Med 122:951-956, 1998.

Zarbo RJ, Nakhleh RE: Surgical pathology specimens for gross exam only and exempt from submission: A College of American Pathologists Q-Probes study of current policies in 413 institutions. Arch Pathol Lab Med 123:133-139,1999.

Nakhleh RE, Gephardt G, Zarbo RJ: Necessity of clinical information in surgical pathology: A College of American Pathologists Q-Probes study of 771,475 surgical pathology cases from 341 institutions. Arch Pathol Lab Med, 123:615-619, 1999.

Zarbo RJ: The oncologic pathology report: Quality by design. Arch Pathol Lab Med 124:1004-1010, 2000.

Schifman RB, Howanitz PJ, Zarbo RJ: Q-Probes: A College of American Pathologists Benchmarking Program for Quality Management in Pathology and Laboratory Medicine. In: Weinstein RS (ed): Advances in Pathology and Laboratory Medicine. Vol. 9. Mosby-Yearbook, Inc., Chicago, 1996, pp.83-120.

Zarbo RJ, Rickert RR: Quality Control, Quality Assurance and Quality Improvement in Anatomic Pathology. In Silverberg S, DeLellis R, Frable J (eds.): Principles and Practice of Surgical Pathology and Cytopathology. 3rd Edition. New York: Churchill Livingstone, 1997.

Zarbo RJ: Monitoring Anatomic Pathology Practice Through Quality Assurance Measures. In: Raab SS (ed.): Pathology Outcomes, Clinics in Laboratory Medicine. Philadelphia: W.B. Saunders, Co., December, 1999, pp.713-742.

Zarbo RJ, Jones BA, Friedberg RC et al: Q-Tracks: A College of American Pathologists Program of Continuous Monitoring and Longitudinal Performance Tracking. Arch Pathol Lab Med 126:1036-1044, 2002.

Zarbo RJ, Nakhleh RE, Walsh M: Customer satisfaction in anatomic pathology: A College of American Pathologists Q-Probes study of 3065 physician surveys from 95 laboratories. Arch Pathol Lab Med 127: 23-29, 2003.